



Small-Scale Packaged Integrated Energy Systems



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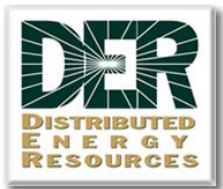
**Integrated Energy Systems (IES)
Peer Review Meeting**

**Nashville, Tennessee
May 2, 2002**



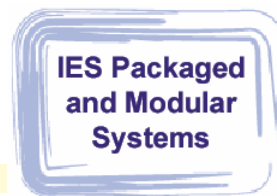
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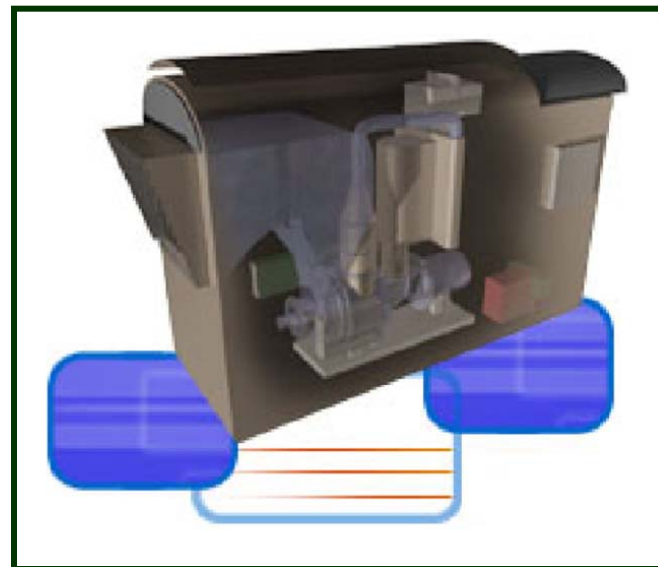
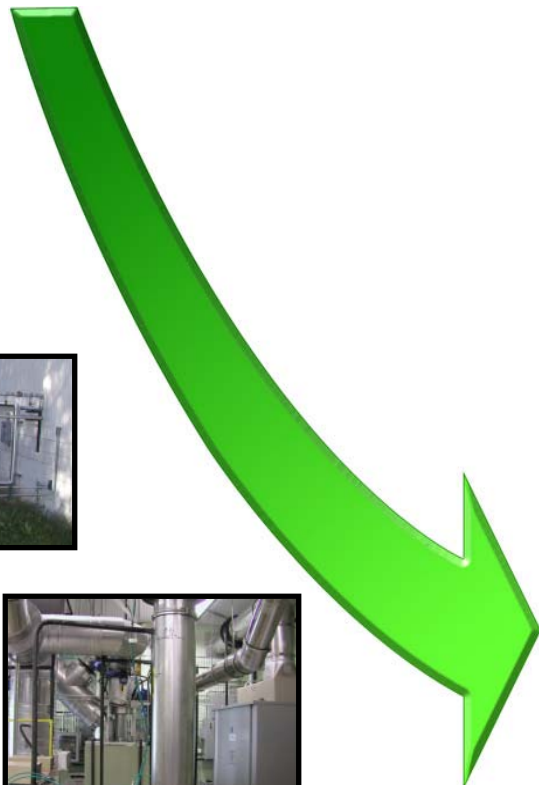


IES Vision

Packaged System Integration



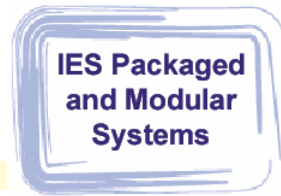
2001: Individually optimized products combined on site



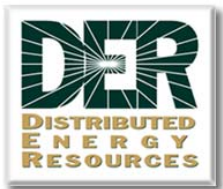
2010: IES – single optimized package from manufacturer



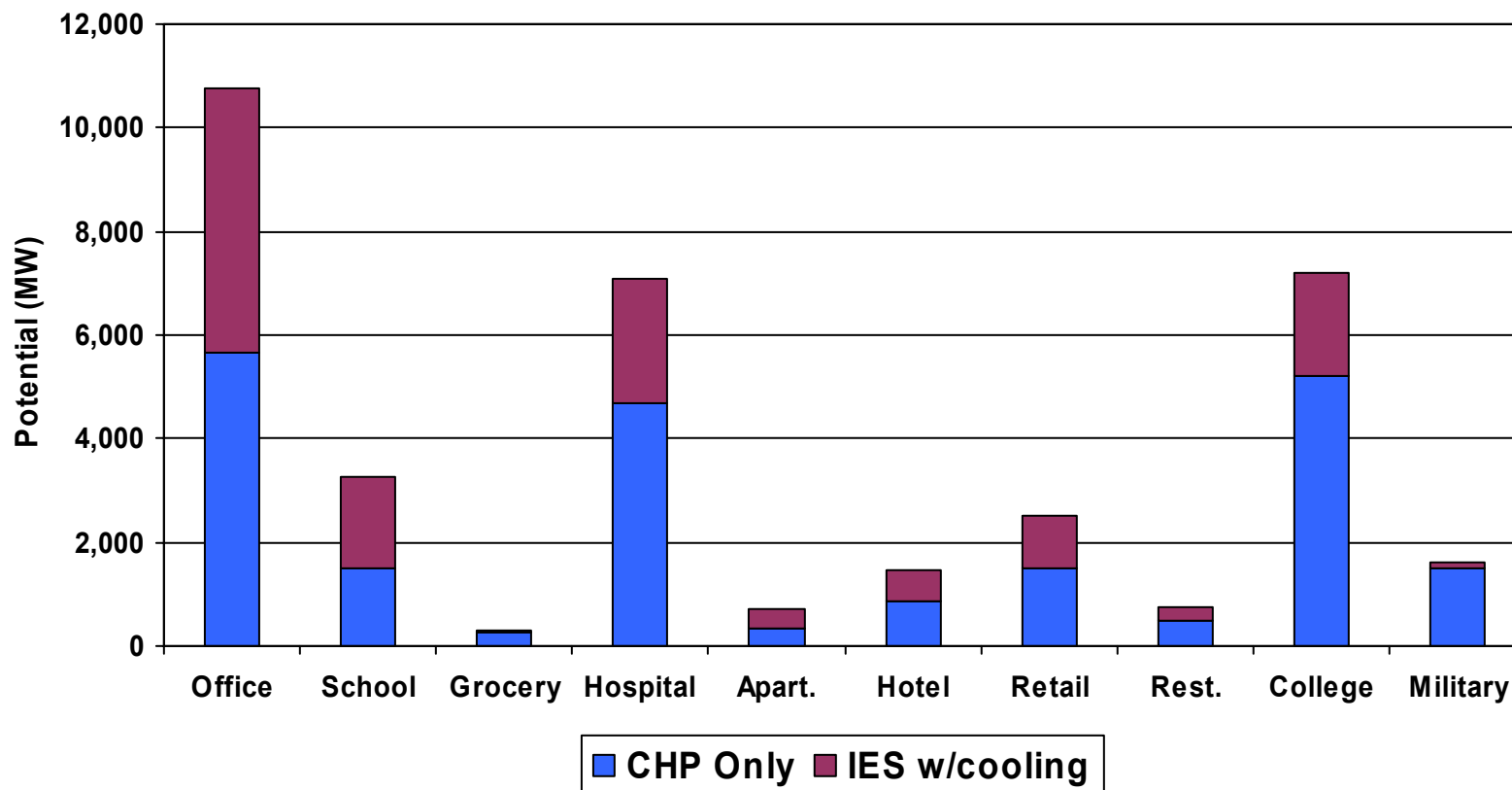
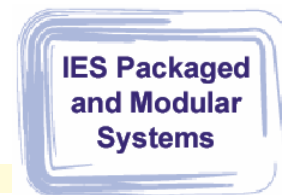
Benefits of Packaged CHP Systems



- **Compared to today's custom engineered CHP systems, packaged systems should:**
 - Improve performance (efficiency)
 - Increase reliability
 - Reduce first (capital plus installation) cost
 - Reduce maintenance cost
- **“One-Stop Shopping”**
 - Packaged Systems will simplify the evaluation, specification, bidding and purchasing of CHP systems.
- **This will enable many more architects, engineers, developers, and building owners to easily consider and use these systems.**



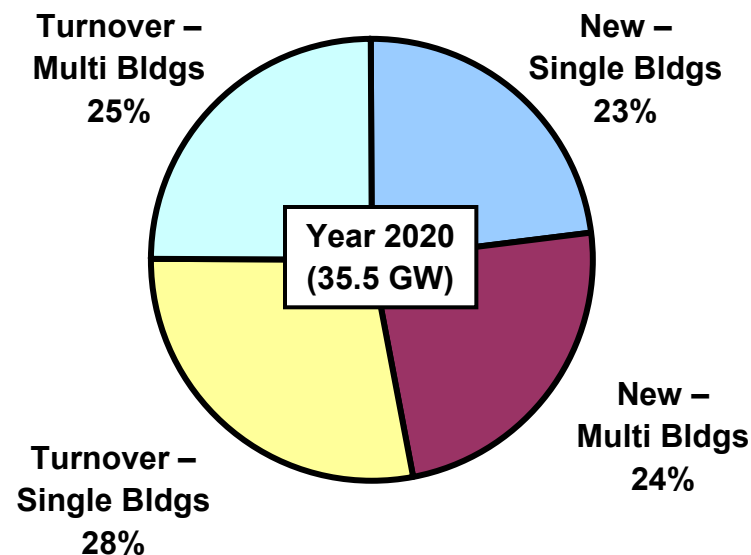
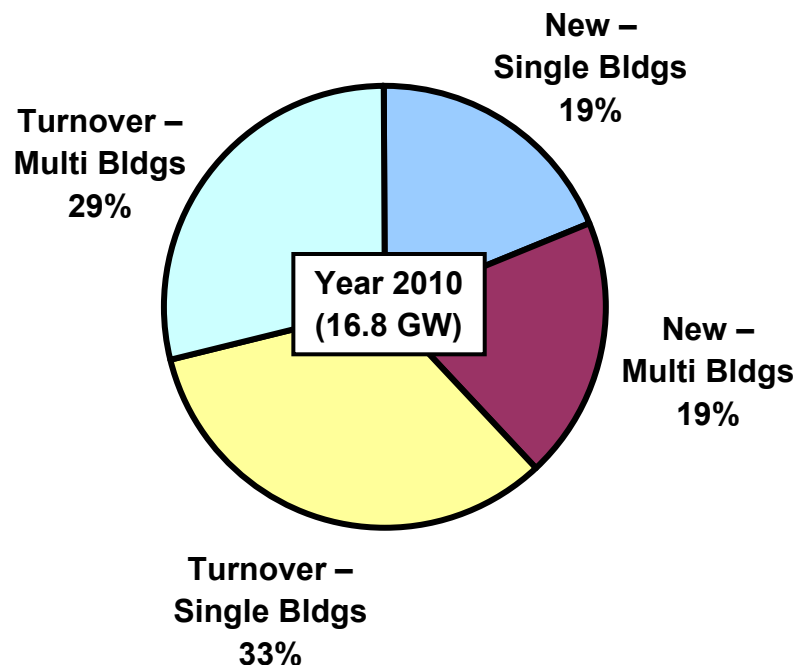
IES Economic Market Potential by Building Type





IES Economic Market Potential Single & Multi-Building Facilities

IES Packaged
and Modular
Systems





IES-TAT Program Goals



Year 2010:

- To develop the technology, application knowledge, and infrastructure necessary to enable IES to provide - at least 8 GW of on-site electrical power and an additional 10 GW of *useful* thermal energy.
- This effectively contributes a total of 18 GW of affordable efficient energy to the Nation's energy network.



Small Scale – 30kW to 600kW

IES Packaged
and Modular
Systems

- **Capstone**
 - 30 to 60 kW



- **NiSource**
 - Multiple micro-turbines

NiSource



- **Ingersoll Rand**
 - 70kW



- **UTRC/DTE/Carrier Team**
 - 300 to 600kW “mini-turbine”

